PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Marco STURA et al. Group Art Unit: 2643

Application No.: 10/625,909

Filed: July 24, 2003 Attorney Dkt. No.: 59643.00294

For: CHARGING IN COMMUNICATION NETWORKS

CLAIM FOR PRIORITY UNDER 35 USC § 119

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 2, 2003

Sir:

The benefit of the filing dates of the following prior foreign application filed in the following foreign country is hereby requested for the above-identified patent application and the priority provided in 35 U.S.C. §119 is hereby claimed:

British Patent Application No. 0311004.6 filed on May 13, 2003 in Great Britain

In support of this claim, a certified copy of said original foreign application is filed herewith.

It is requested that the file of this application be marked to indicate that the requirements of 35 U.S.C. §119 have been fulfilled and that the Patent and Trademark Office kindly acknowledge receipt of this document.

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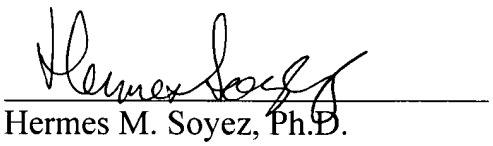

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Enclosure: Priority Document (1)

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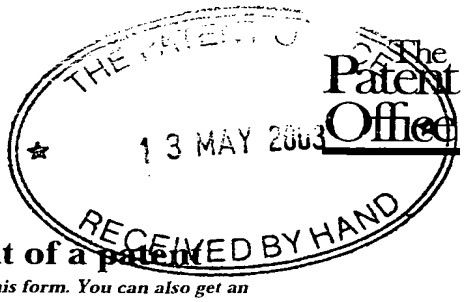

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303511GB/KCS/erw

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0311004.6

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Nokia Corporation
Keilalahdentie 4
FIN-02150 Espoo
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Patents ADP number *(if you know it)*

76522170 01

If the applicant is a corporate body, give the country/state of its incorporation

Finland

4. Title of the invention

Charging in Communication Networks

5. Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

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Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

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11. I/We request the grant of a patent ~~on the~~ basis of this application.

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CHARGING IN COMMUNICATION NETWORKS

Field of the Invention

The present invention relates to charging in communication networks, and in particular but not exclusively in third generation (Universal mobile telecommunication system UMTS) networks.

Background of the Invention

A communication system is a facility that enables communication between two or more entities such as user terminal equipment and/or network entities and other nodes associated with a communication system. The communication may comprise, for example, communication of voice, electronic mail (email), text messages, data, multimedia and so on.

The communication may be provided by a fixed line and/or wireless communication interfaces. A feature of wireless communication systems is that they provide mobility for the users thereof. An example of communication systems providing wireless communication is a public land mobile network (PLMN). An example of the fixed line system is a public switched telephone network (PSTN).

A communication system typically operates in accordance with a given standard or specification which sets out what the various elements of a system are permitted to do and how that should be achieved. For example, the standard or specification may define if the user, or more precisely user equipment, is provided with a circuit switched server or a packet switched server or both. Communication

protocols and/or parameters which should be used for the connection are also typically defined. For example, the manner how communication shall be implemented between the user equipment and the elements of the communication networks is typically based on a predefined communication protocol. In other words, a specific set of "rules" on which the communication can be based on needs to be defined to enable the user equipment to communicate via the communication system.

The introduction of Third Generation (3G) communication systems will significantly increase the possibilities for accessing services on the Internet via mobile user equipment (UE) as well as other types of UE.

Various user equipment (UE) such as computers (fixed or portable), mobile telephones, personal data assistants or organisers and so on are known to the skilled person and can be used to access the Internet to obtain services. Mobile user equipment referred to as a mobile station (MS) can be defined as a means that is capable of communication via a wireless interface with another device such as a base station of a mobile telecommunication network or any other station.

The term "service" used above and hereinafter will be understood to broadly cover any service or goods which a user may desire, require or be provided with. The term also will be understood to cover the provision of complimentary services. In particular, but not exclusively, the term "service" will be understood to include Internet protocol multimedia IM services, conferencing, telephony, gaming, rich call, presence, e-commerce and messaging e.g. instant messaging.

The 3G Partnership Project (3GPP) is defining a reference architecture for the Universal Mobile Telecommunication System (UMTS) core network which will provide the users of user equipment UE with access to these services. This UMTS core network is divided into three principal domains. These are the Circuit Switched domain, the Packet Switched domain and the Internet Protocol Multimedia (IM) domain.

The latter of these, the IM domain, makes sure that multimedia services are adequately managed. The IM domain supports the Session Initiation Protocol (SIP) as developed by the Internet Engineering Task Force (IETF).

SIP is an application layer signalling protocol for starting, changing and ending user sessions as well as for sending and receiving transactions. A session may, for example, be a two-way telephone call or multi-way conference session or connection between a user and an application server (AS). The establishment of these sessions enables a user to be provided with the above-mentioned services. One of the basic features of SIP is that the protocol enables personal mobility of a user using mobile UE by providing the capability to reach a called party (which can be an application server AS) or another user equipment via a single location independent address.

A user connected to SIP based communication system may communicate with various entities of the communication system based on standardised SIP messages. SIP is defined in an Internet Engineering Task Force (IETF) protocol specification by G Rosenberg et al titled. "SIP: session

initiation protocol" RFC 3261, July 2001. This document is incorporated by reference.

One version of the third generation standard is "release 5" or "rel5". This introduces the IP multimedia core network subsystem that has been developed to use SIP technology as a basis for all IP services such as voice over IP, amongst others. The SIP standard is a rendezvous protocol which can be used to establish media sessions between a SIP user agent client (UAC) and a SIP user agent server (UAC). To open a session, SIP uses the SDP (session description protocol) protocol and it is thus possible to establish a variety of sessions depending on the used application both for real time services and non real time services. The SIP is a flexible protocol that can be used to establish different type of sessions. For example, some sessions may require a certain precondition to be satisfied. Other sessions may require reliable provisional responses. Other sessions may require confirmation of reserved resources. It is also possible to have a variable number of SDP offer/answer exchanges.

In order to enable charging correlation at the media component level for charging events related to the same SIP session and generated in different domains (i.e. access network and IM subsystem (IMS) network) for the same SIP session, the access network charging identifier identifying the resource reservation carrying a particular media flow (e.g. in GPRS (general packet radio service) access the GPRS Charging Identifier and GGSN (gateway GPRS support node) address) needs to be sent and distributed in the IMS network. This access charging identifier is sent to P-CSCF(PDF) (proxy call session control function and policy decision function respectively) via the Go

interface and distributed in IMS in a SIP "UPDATE" message. With the next version which has been proposed for the 3GPP standard, "release 6" or "rel6" it is possible that for some session set up scenarios an UPDATE message is not sent at all. This results in the problem that the network is unable to distribute the charging identifier between the network elements that require this information.

In the current proposals for release 5, the UPDATE request is sent from the user equipment to the P-CSCF. A confirmation of the preconditions are requested in a response when the user equipment finishes a quality of service reservation for both the up link and down link directions. The calling party sends the UPDATE request to the terminating end point via the signalling path established by the INVITE request. The UPDATE request includes in the SDP, the information about the successful quality of service bi-directional mode, due to the successful bi-directional PDP context established. The SDP indicates that the quality of service resource reservation for both send and receive mode was successful from the terminating end point side.

With the proposals for release 6, for example, it is possible that a session can be established by a simple SIP INVITE/200 OK transaction or it is possible that the end points involved in the session set up will not make use of preconditions or not ask for confirmation of reserved resources. In all of these cases, the UPDATE message will not be sent and thus distribution of the charging identity is not possible.

Summary of the Invention

It is an aim of embodiments of the present invention to address the problems discussed previously

According to a first aspect of the present invention, there is provided a method for supporting a communication session of an user equipment, by means of a communication system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the method comprising the steps of:

a) establishing a session between the user equipment and the node via said at least one entity;

b) putting the session on hold;

c) reserving resources for said session while said session is on hold; and

d) resuming said session and distributing charging information.

According to a second aspect of the invention, there is provided a method for supporting a communication session of an user equipment, by means of a communication system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the method comprising the steps of:

a) modifying an existing session between the user equipment and the node via said at least one entity;

b) putting the session on hold;

c) reserving resources for the modified session while said session is on hold; and

d) resuming said session and distributing charging information.

According to another aspect of the invention, there is provided a communication system for supporting a communication session of an user equipment, said system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the system being arranged to establish a session between the user equipment and the node via said at least one entity, at least one of said node and said user equipment being arranged to put the session on hold, at least one of said node and said user equipment being arranged to reserving resources for said session while said session is on hold, at least one of said node and said user equipment being arranged to resume said session; and at least one entity is arranged to distribute charging information.

According to another aspect, there is provided a communication system for supporting a communication session of an user equipment, said system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the system being arranged to modify a session between the user equipment and the node via said at least one entity, at least one of said node and said user equipment being arranged to put the session on hold, at least one of said node and said user equipment being arranged to reserving resources for said modified session while said session is on hold, at least one of said node and said user equipment being arranged to resume said session and at least one entity is arranged to distribute charging information.

Brief Description of Drawings

For a better understanding of the present invention and as to how the same may be carried into effect, reference will now be made to the accompanying drawings in which:

Figure 1 shows a schematic system in which embodiments of the present invention can be implemented;

Figure 2 shows the signal flow in a first embodiment of the invention; and

Figure 3 shows the signal flow in a second embodiment of the invention.

Detailed Description of Embodiments of the Invention

In this document, SIP messages are indicated in capitals.

Embodiments of the present invention are particularly applicable to the release 6 version of 3GPP which will allow the terminals i.e. the user equipment to decide for themselves how to use SIP for communication purposes. It should be appreciated that embodiments of the present invention may be applicable to any other version of the 3GPP standard or indeed any other standard.

Embodiments of the present invention are arranged to define a mechanism which works with the existing SIP specifications to ensure the proper working of the charging correlation mechanism in any scenario where no precondition is used or UPDATE is only used to modify the already set up session. In other words, if an UPDATE request is not used in the session setup phase before the dialog is confirmed (i.e. final response received to the request), embodiments of the present invention may be used.

Reference is made to figure 1 which shows schematically a system in which embodiments of the invention can be implemented. The system comprises user equipment 2. The user equipment 2 can take any suitable form and may for example be a mobile or fixed entity such as a mobile telephone, personal digital assistant (PDA), portable computer, laptop computer, fixed computer or any other suitable device. The user equipment 2 is arranged to communication with a first radio access network (RAN) 4a via a wireless connection. This wireless connection may be at any suitable frequency, such as for example a radio frequency.

The first radio access network 4a generally consists of a base station entity (sometimes referred to as node B). For the purpose of this document, the term base station will be used and is intended to cover any suitable entity. The radio access network 4 also comprises a control element. Depending on the standard, the control element can be referred to as a radio network controller (RNC) in the case of a UMTS system or a base station controller (BSC) in the case of a GSM system. It is intended that the term controller cover any such control entity. In some arrangements, the control function is provided separately from the base station function and a single control entity may control a number of base stations. In other embodiments of the present invention, each base station may incorporate part of the control function.

The radio access network is arranged to communicate with a core network 6. The core network 6 illustrated in figure 1 is a packet switched core network. The first radio access network 4 is connected to a serving GPRS (general

packet radio service) support node SGSN 10. The SGSN 10 is used to switch the packet switched transactions.

The SGSN 10 is connected to first and second gateway GPRS support nodes GGSN 12a and b. These are switches at the point where the core network 6 is connected to external packet switched networks. Incoming and outgoing packet switched connections will go through a GGSN. In the arrangement shown in figure 1, the GGSNs 12a and b are shown as being connected to an IM (IP multi-media) subsystem 14. Each GGSN 12 is connected to a P-CSCF 16a and b (proxy call session control function) respectively. Each P-CSCF 16a and b has a PDF (policy decision function). PDF is part of the service based local policy (SBLP) architecture of the IP multimedia subsystem. The policy decision function is a logical policy decision element which uses IP mechanisms to implement service based local policy in the IP bearer layer. The PDF makes decisions in regard to SBLP using policy rules and communicates those decisions to the GGSN, which is the IP policy enforcement point (PEP). In the arrangement shown in figure 1, the PDFs 18a and b respectively are shown as being a logical entity of the respective P-CSCF. However, it should be appreciated that in alternative embodiments of the present invention, the PDF may be a separate entity or incorporated in any other suitable entity.

The P-CSCF 16a and b are connected to an interrogating(I)-CSCF 22. The I-CSCF 22 is arranged to determine the appropriate serving-CSCF (S) 24 for the end user, that is the called party..

Figure 1 also shows an application server AS 23 in the IM network. The GCID may be distributed to the AS in some embodiments of the invention.

Also shown in Figure 1 is a user 30 which does not operate in accordance with the third generation standard and for example may use the SIP protocol. The user 30 is connected to a SIP proxy 32 which enables the user agent client to obtain services via the IM subsystem 14. The SIP proxy 32 is connected to the S-CSCF 24. The SIP proxy may be part of an ISP core. The user may be user equipment such as a PC, softphone or the like.

In embodiments of the invention, the core network 6 and the IMS system 14 are connected to a CGF (Charging Gateway Function) 40 which includes a charging collector function CCF. The CCF alternatively may be a separate entity. The CGF 40 is connected to a billing system 42. The billing system is part of the operator's network. Likewise the CGF is usually part of the operator's network. The CGF and/or the billing system use a common charging identifier generated in the network (access and IMS) to correlate charging information which will then determine how much a user is billed for a given session. It should be appreciated that in alternative embodiments of the invention any other suitable billing mechanism can be used.

Also shown in Figure 1 is a second user equipment 26 which is connected to a second RAN 4b. It should be appreciated that this is for illustrative purposes and in practice each RAN may be arranged to communicate with a relatively large number of user equipment. The second RAN 4b is connected to the SGSN 10.

Also shown in Figure 1 is a terminal 43 such as a PC or the like which is arranged to be connected to the second P-CSCF 18b via another access network 44 which can be in accord with any suitable access technology.

In embodiments of the present invention the SIP user agent client UAC is the calling party which in the two examples shown will be the user equipment 2 and the user equipment 30. The SIP user agent server UAS is the called party which in the examples shown will be the user equipment 26 and the user equipment 2. It should be appreciated that this is by way of example only and any of the terminals or user equipment can be the called party and the calling party respectively.

In embodiments of the invention, the GCID (GPRS charging identifier) is sent from the GGSN to the PDF functionality. If the PDF functionality is separate from the P-CSCF, the GCID will also be sent to the P-CSCF. The messages are sent over the Go interface, that is the interface between the GGSN and the P-CSCF, using COPS (Common Open Policy Service) protocol messages. COPS is the protocol used for the Go interface. The GCID is distributed in SIP signalling to other IMS functions such as the S-CSCF, the application server and the I-CSCF.

The GCID is generated by the GGSN for a GPRS PDP context. There is a one to one relationship between the GCID and the PDP context. If GPRS is used to access the IMS, the GCID is used together with the GGSN address as the access part of the charging correlation vector that is comprised of an access part and an IMS part, which is the IMS

charging identifier. The charging vector is described in more detail hereinafter.

It should be appreciated that embodiments of the present invention may be used with access technologies other than GPRS. Embodiments of the invention are particularly applicable where the PDF function and the Go interface are used, that is where SBLP is used at least for charging correlation.

If the terminal i.e. the user equipment does not use preconditions or 100 REL (SIP preconditions) then it is not possible to distribute the GCID. In this scenario, the terminal will put the session on hold during the first SDP (session description protocol) offer/answer exchange. After reserving the resources for the session, the terminal will resume the session with a re-INVITE message which can then distribute the GCID from the P-CSCF to other IMS functions. The GCID is included in a P-charging-vector, which is described in more detail hereinafter. In particular, the P-CSCF will put the GCID information into the P-charging-vector header in the re-INVITE request which resumes the media previously put on hold.

In the alternative, if the terminal modifies the existing session by adding a media component or changing the previously used codec, there is no opportunity to carry the GCID to the S-CSCF or other functions in the IMS. Thus, in this case and embodiments of the present invention, the terminal puts the new media on hold and resumes the media with a re-INVITE message once the resources have been successfully reserved. The re-INVITE message, thus distributes the GCID in the IMS network.

Embodiments of the present invention can be used in IMS network with whatever access network is used as long as the Go interface is implemented at least for charging correlation.

Reference is now made to figure 2 which shows the signalling used in a first embodiment of the present invention. Those elements which are the same as shown in figure 1 are referred to using the same reference numbers. It should be appreciated that some elements, for example the I-CSCF, which would be present in practice have been omitted for clarity. This embodiment of the invention shows an example where the calling party is a non third generation entity.

In step S1, the UAC or user equipment 30 sends an INVITE message to a non-3GPP SIP proxy 32. The SIP proxy 32 sends the INVITE message in step S2 to the S-CSCF 24. The S-CSCF 24 sends the INVITE message in step S3 to the first P-CSCF 16a and more specifically to do PDF function thereof. The first P-CSCF 16a forwards the INVITE message in step S4 to the user agent server or user equipment 2. The user agent server 2 causes the media streams to be inactive in step S5.

The user agent server 2 sends a message to the first P-CSCF 16a in step S6 which is a 200 OK message and indicates in the SDP that the session is inactive. This message is forwarded by the first P-CSCF 16a to the S-CSCF 24 in step S7. In step S8, the message is forwarded by the S-CSCF 24 to the SIP proxy 32. In step S9, the message is forwarded by the SIP proxy 32 to the user agent client 30.

In step S10, the user agent client 30 sends an acknowledgement ACK that it has received the message. This acknowledgement includes the SDP indicating inactive session. This is sent to the SIP proxy 32. In step S11, the SIP proxy 32 forwards the message to the S-CSCF 24. This message is forwarded in turn by the S-CSCF 24 to the first P-CSCF 16a in step S12. In S13, the messages forwarded by the first P-CSCF 16a to the user agent server 2. In step S14, the user agent server 2 in conjunction with first GGSN 12a reserve resources. In step S15, once the resources have been reserved, the media streams are set to be active by the user agent server 2. Step S15 can take place at the same time as step S16. In step S16, there are interactions between the GGSN 12a and P-CSCF 16a via the Go interface. In this step ICID (IMS Charging Identifier) and GCID information can be exchanged. The ICID is used for session level correlation while the GCID is used for media component level correlation. GCID identifies the access charging information related to a particular media component assuming that session/media are not multiplexed in the same PDP Context (3GPP Rel 5).

In step S17, the user agent server 26 sends a re-INVITE message with the SDP indicating active session (i.e. the medias attributes are set to sendrecv. a=sendrecv for all the medias that need to be active in the session) information. This message is forwarded by the first P-CSCF 16a to the S-CSCF 24. However, the first P-CSCF 16a also includes the P-charging vector with the GCID information. The S-CSCF 24 forwards the INVITE message (with or without the P-charging vector) in step S19. In step S20, the message is sent from the SIP proxy 32 to the UAC 30.

Reference is made to figure 3 which shows a second embodiment of the present invention. This illustrates the signal flow of an example of a session established between 3GPP user agents without any preconditions. There is a first 3GPP user application client, which is the user equipment 2. This is associated with the first GGSN 12a and the first P-CSCF 16a with a PDF functionality. The user application agent server or user equipment 26 is associated with the second GGSN 12b and a second P-SCSF 16b. The two P-CSCFs are shown communicating via a common S-CSCF 24. However, in some embodiments of the present invention more than one S-CSCF may be provided and indeed there are other entities which have been omitted for clarity.

In step T1, the user agent client 2 sets the media streams to be inactive. In step T2, the user agent client 2 sends an INVITE message with SDP indicating the media streams are inactive to the first P-CSCF 16a. The first P-CSCF 16a forwards the message in step T3 to the S-CSCF 24. The S-CSCF 24 forwards the message in step T4 to the second P-CSCF 16b which in turn forwards that message in step T5 to the user agent server 26.

In step T6, the user agent server 26 sends a 200 OK acknowledgment with the SDP indicating an inactive session to the second P-CSCF 16b. In step T7 the message is forwarded by the second P-CSCF 16b to the S-CSCF 24 which in turn forwards that message to the first P-CSCF 16a in step T8. The first P-CSCF 16a forwards the message in step T9 to the user agent client 2.

In step T10 the user agent client 2 sends an acknowledgement message ACK to the first P-CSCF 16a. This

acknowledgement is forwarded by the first P-CSCF 16a to the S-CSCF 24 in step T11 and by the S-CSCF 24 to the second P-CSCF 16b in step T12. The acknowledgment is forwarded by the second P-CSCF 16b in step T13 to the user agent server 26.

In step T14, resource reservation is carried out between the user agent server 26 and the second GGSN 12b. Step T16 may take place at the same time as step T14 and resources are reserved between the user agent client 2 and the first GGSN 12a. In step T15, there is interaction between the second GGSN 12b and the second P-CSCF 16b on the Go interface involving the ICID and the GCID. This is as described in relation to Figure 2. Step T17 is similar to step T15 but between the first GGSN 12a and the first P-CSCF 16a. Steps T15 and T17 may take place at the same time. In step T18, the user agent client 2 sets the media streams to be active.

The user agent client 2 then sends an INVITE message with SDP indicating active media streams (i.e. the medias attributes are set to sendrecv. a=sendrecv for all the medias that need to be active in the session) information in step T19 to the first P-CSCF 16a.

In step T20, the P-CSCF 16a adds in the P-charging-vector including the GCID. In step T21, the INVITE message is forwarded by the S-CSCF 24 to the second P-CSCF 16b which in turn forwards that message in step T22 to the user agent server 26. The user agent server 26 sends an acknowledgement message 200 OK with the SDP containing an a=sendrecv information. The second P-CSCF 16b sends a message in step T24 to the S-CSCF 24 along with the P-

charging-vector with the GCID information. In step T25, the S-CSCF 24 forwards the message without the P-charging-vector, to the first P-CSCF 16a which in turn forwards that message to the user agent client 2 in step T26.

In one alternative modification to the arrangement shown in the first embodiment, the initial INVITE messages (steps S1 to S4) may include SDP with a=sendrcv information, as in steps T1 to T5 of the second embodiment. Likewise, steps S10 to S13 can be modified in such a scenario to have the same form as shown in steps T10 to T13 of the second embodiment that is not to include the SDP information. Conversely, steps T1 to T5 can be modified so that the INVITE message does not include the SDP information as in steps S1 to S4 of the first embodiment. Likewise, the acknowledgement message sent in steps T10 to T13 would have the SDP media stream inactive information.

The table below shows the P-charging-vector in more detail. This is defined in the 3GPP specification number TS 24.229 and TS 24.228 which is hereby incorporated by reference.

```
access-network-charging-info = (gprs-charging-info / generic-param)
gprs-charging-info = ggsn *(SEMI pdp-info) [SEMI extension-param]
ggsn = "ggsn" EQUAL gen-value
pdp-info = pdp-sig SEMI gcid SEMI auth-token [SEMI flow-id]
pdp-sig = "pdp-sig" EQUAL ("yes" / "no")
gcid = "gcid" EQUAL gen-value
auth-token = "auth-token" EQUAL gen-value
flow-id = "flow-id" EQUAL gen-value
extension-param = token [EQUAL (token | quoted-string)]
```

The P-charging-vector header field has the fields described in RFC 3455 of the IETF which is hereby incorporated by reference.

The access network charging info parameter is an incidence of a generic parameter from the current charge parameter component of the P-charging-vector header. The access network charging info parameter includes alternative definitions for different access networks. In this example, GPRS is the supported access network as indicated in the GPRS-charging-parameter. In other embodiments of the invention, other access networks may be supported. For GPRS there are the following components to track; GGSN address and one or more PDP contexts (PDP-info parameter), an associated GPRS charging identifier (GCID parameter), a media authorisation token (or-token parameter) and one or more flow identifiers (flow-id parameter) that identify associated m-lines within the SDP from the SIP signalling. These parameters are transferred from GGSN to the P-CSCF (PDF) over the Go interface.

It should be appreciated that embodiments of the present invention can be used for on-line charging or off-line charging.

It is noted herein that while the above described are exemplifying embodiments of the invention, there are several variations and modifications which may be made to the disclosed solution without departing from the scope of the present invention as defined in the appended claims.

CLAIMS

1. A method for supporting a communication session of an user equipment, by means of a communication system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the method comprising the steps of:

a) establishing a session between the user equipment and the node via said at least one entity;

b) putting the session on hold;

c) reserving resources for said session while said session is on hold; and

d) resuming said session anddistributing charging information.

2. A method as claimed in claim 1, comprising the step of determining if charging information is provided during the establishment of said session and only if not then steps b) to d) are carried out.

3. A method for supporting a communication session of an user equipment, by means of a communication system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the method comprising the steps of:

a) modifying an existing session between the user equipment and the node via said at least one entity;

b) putting the session on hold;

c) reserving resources for the modified session while said session is on hold; and d) resuming said session and distributing charging information.

4. A method as claimed in claim 3, comprising the step of determining if charging information is provided during the modifying of said session and only if not then steps b) to d) are carried out.

5. A method as claimed in any preceding claim, wherein SIP is used for said session.

6. A method as claimed in any preceding claim, wherein at least part of said communication system operates in accordance with UMTS standard.

7. A method as claimed in any preceding claim, wherein said charging information comprises a charging identifier.

8. A method as claimed in claim 7, wherein said charging identity comprises a GCID and or an ICID.

9. A method as claimed in any preceding claim, wherein the charging information is provided in a charging vector.

10. A method as claimed in claim 9, wherein said charging vector is a P-charging-vector.

11. A method as claimed in any preceding claim, wherein said at least one entity comprises a GGSN.

12. A method as claimed in any preceding claim, wherein said at least one entity comprises a P-CSCF.

13. A method as claimed in any preceding claim, wherein said at least one entity comprises a PDF function.

14. A method as claimed in claims 11 and 12 or claims 11 and 13 or any claim appended thereto, comprising the step of sending the charging information from the GGSN to the P-CSCF and/or PDF.

15. A method as claimed in claim 14, wherein said charging information is sent from the GGSN to the P-CSCF and/or PDF in a COPS message.

16. A method as claimed in any preceding claim, wherein said node comprises an user agent server.

17. A method claim as claimed in claim 5 or any claim appended thereto wherein said charging information is sent in an INVITE message.

18. A method as claimed in any preceding claim wherein said node comprises user equipment.

19. A communication system for supporting a communication session of an user equipment, said system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the system being arranged to establish a session between the user equipment and the node via said at least one entity, at least one of said node and said user equipment being arranged to put the session on hold, at least one of said node and said user equipment being arranged to reserving resources for said session while said session is on hold, at least one of said node and said user equipment being arranged to resume said session; and at least one entity is arranged to distribute charging information.

20. A communication system for supporting a communication session of an user equipment, said system comprising at least one entity between said user equipment and a node with which the user equipment is arranged to establish a session, the system being arranged to modify a session between the user equipment and the node via said at least one entity, at least one of said node and said user equipment being arranged to put the session on hold, at least one of said node and said user equipment being arranged to reserving resources for said modified session while said session is on hold, at least one of said node and said user equipment being arranged to resume said session and at least one entity is arranged to distribute charging information.

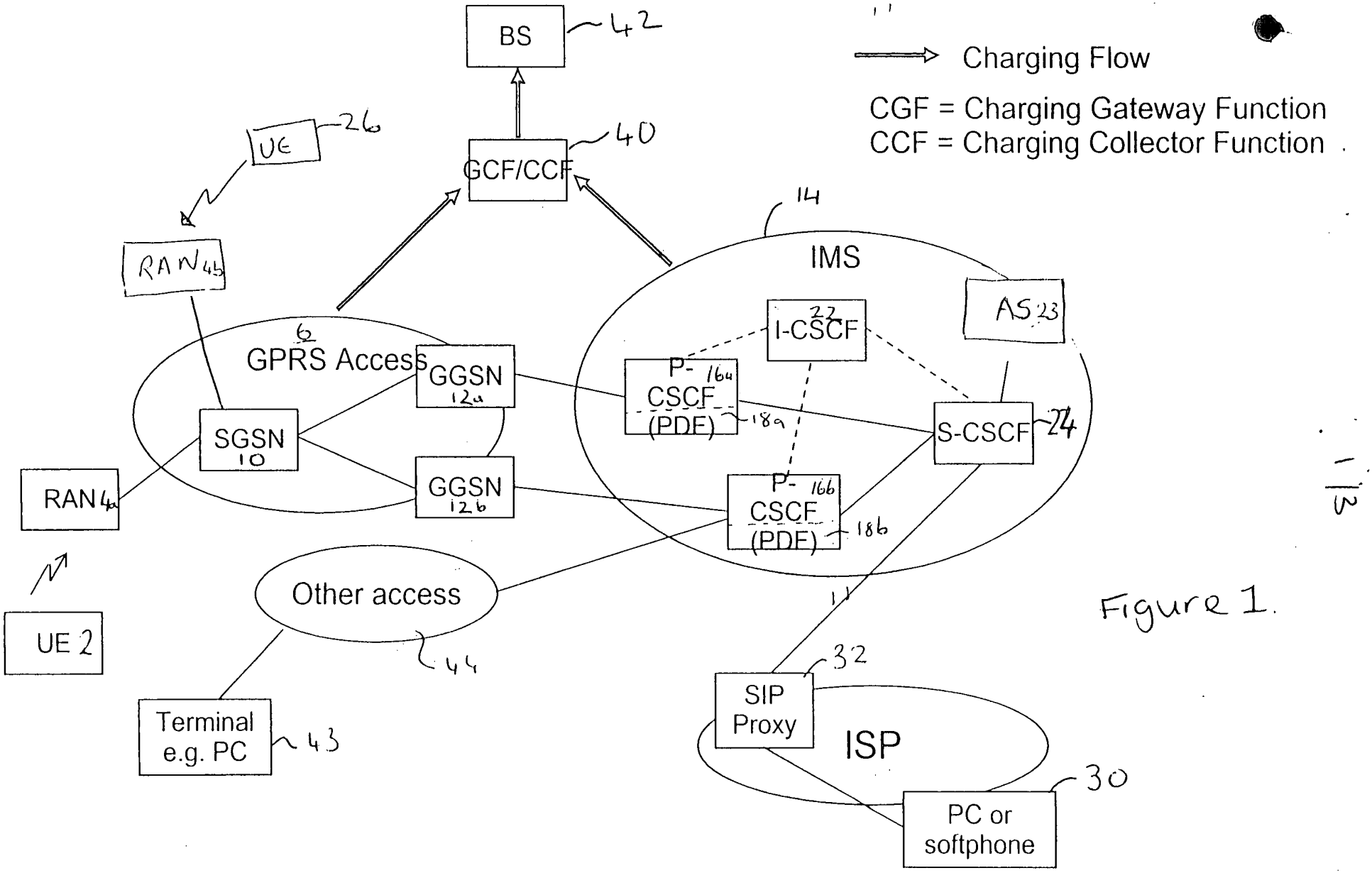
BS
42
Charging Flow
CGF = Charging Gateway Function
CCF = Charging Collector Function
UE
26
GCF/CCF
40
14
IMS
RAN
45
6
GPRS Access
GGSN
12a
I-CSCF
22
AS
23
P-CSCF (PDF)
164
189
S-CSCF
24
SGSN
10
GGSN
12b
P-CSCF (PDF)
166
186
RAN
46
Other access
44
UE 2
Terminal e.g. PC
43
SIP Proxy
32
ISP
PC or softphone
30

Figure 1.

FIGURE 2

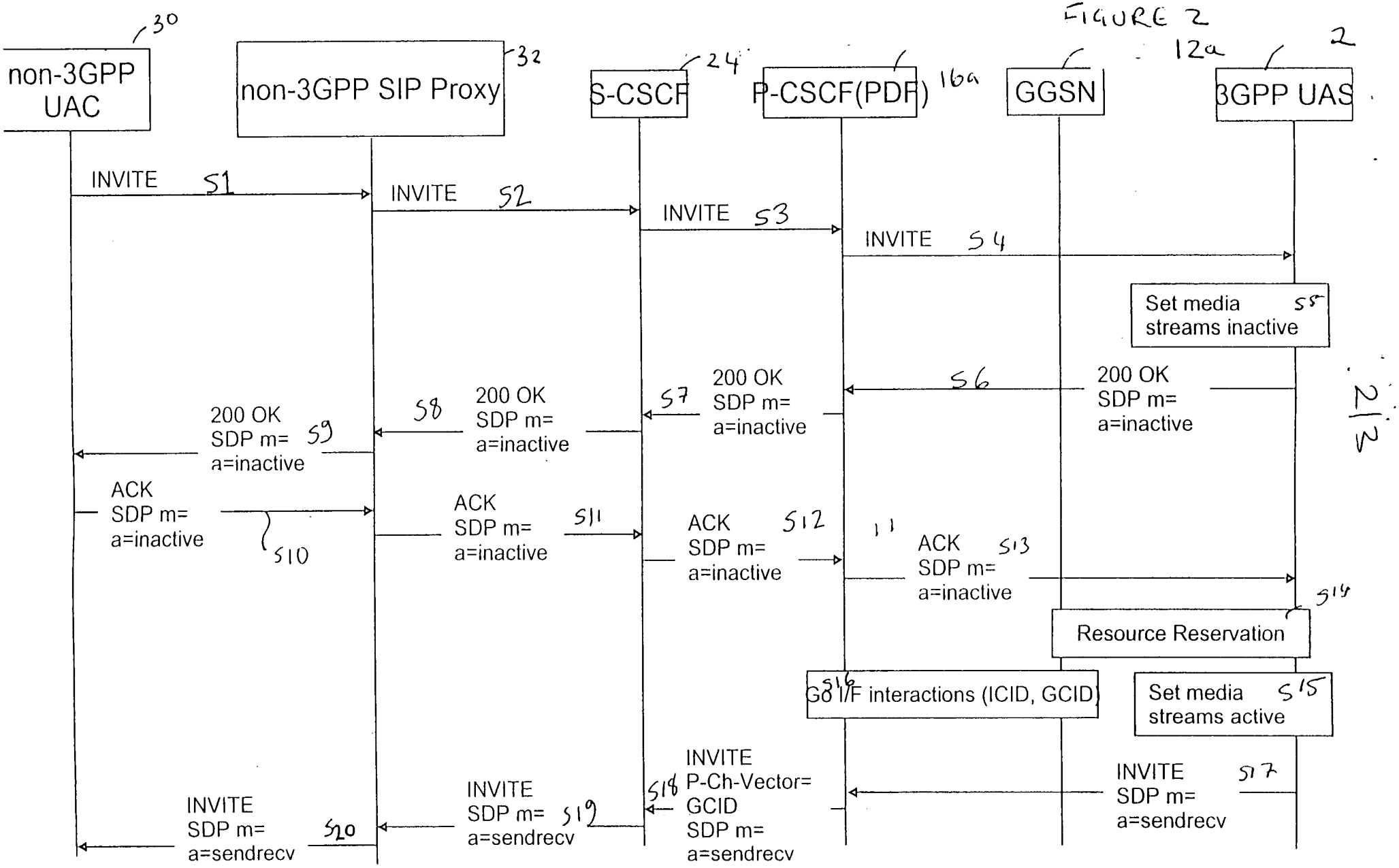

FIGURE 2

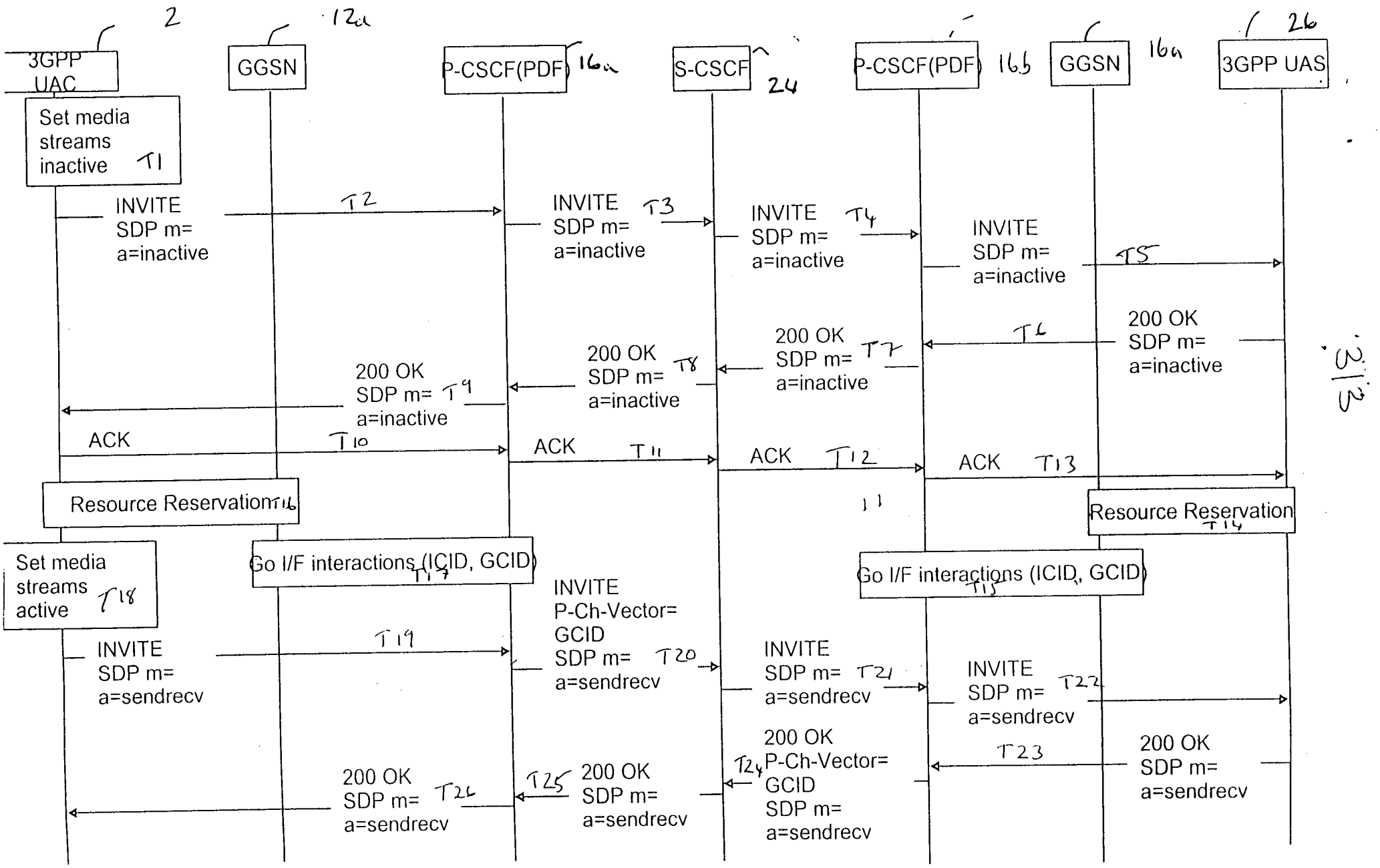
2
12a
3GPP UAC
GGSN
P-CSCF(PDF) 16a
S-CSCF 24
P-CSCF(PDF) 16b
GGSN 16a
3GPP UAS 26
Set media streams inactive T1
INVITE SDP m= a=inactive T2
INVITE SDP m= a=inactive T3
INVITE SDP m= a=inactive T4
INVITE SDP m= a=inactive T5
200 OK SDP m= a=inactive T6
200 OK SDP m= a=inactive T7
200 OK SDP m= a=inactive T8
200 OK SDP m= a=inactive T9
ACK T10
ACK T11
ACK T12
ACK T13
Resource Reservation T16
Resource Reservation T14
Set media streams active T18
Go I/F interactions (ICID, GCID) T17
Go I/F interactions (ICID, GCID) T15
INVITE SDP m= a=sendrecv T19
INVITE P-Ch-Vector= GCID SDP m= a=sendrecv T20
INVITE SDP m= a=sendrecv T21
INVITE SDP m= a=sendrecv T22
200 OK P-Ch-Vector= GCID SDP m= a=sendrecv T24
200 OK SDP m= a=sendrecv T23
200 OK SDP m= a=sendrecv T25
200 OK SDP m= a=sendrecv T26

FIGURE 3